CLAIMS

1. A fluid pump controlling system, the fluid pump (10) comprising a piston displaceably positioned in a cylinder, the cylinder having a piston displacement stroke and the cylinder having a stroke end,

the system being characterized by comprising:

- a sensing assembly (11) measuring the behavior of the piston, and

- an electronic controller (16) associated to the sensing assembly (11), the electronic controller (16) monitoring the displacement of the piston within the cylinder by detecting an impact signal, the impact signal being transmitted by the sensing assembly (1) upon occurrence of a impact of the piston with the stroke end, the impact signal being transmitted by the sensing assembly (11) to the electronic controller (16),

the electronic controller (16) successively incrementing the piston displacement stroke from the trigger signal until the occurrence of the impact to store a maximum value of piston displacement corresponding to the piston displacement as far as the stroke end.

2. A system according to claim 1, characterized in that the maximum value of piston displacement corresponds to a displacement of maximum efficiency of the fluid pump (10).

3. A system according to claim 2, characterized in that the trigger signal is generated by the electronic controller (16) upon occurrence of a problem on the fluid pump (10).

4. A system according to claim 1 or 3, characterized in that the fluid pump (10) is actuated with a minimum piston displacement stroke.

5. A system according to claim 3 or 4, characterized in that the fluid pump (10) is actuated upon occurrence of the trigger signal.

6. A system according to claim 5, characterized by comprising a first filtering circuit (40) associated to the electronic controller (16), the first filtering circuit (40) being of the high-pass type, the impact signal read by the sensing assembly (11) being filtered by the first filtering circuit (40) and being fed to the electronic controller (16).

7. A system according to claim 6, characterized in that the sensing assembly (11) comprises an impact sensor (35) associated to the cylinder of the fluid pump (10).

8. A system according to claim 7, characterized in that the impact sensor (35) comprises an accelerometer fixed together with the cylinder of the fluid pump (10).

9. A system according to claim 5, characterized in that the sensing assembly (11) comprises a position sensor (36) of the piston displacement stroke, the position sensor (36) being associated to the electronic controller (16).

10. A system according to claim 4, characterized in that the sensing assembly (11) comprises a second filtering circuit (42), associated with an electronic controller (16), the second filtering circuit (42) being of the low-pass type, the signal read by the sensing assembly (11) being filtered by the second filtering circuit (42) and being fed to the electronic controller (16), the signal read being filtered by the second filtering circuit (42) and corresponding to a signal of piston displacement within the cylinder.

11. A system according to claim 10, characterized in that the signal of piston displacement within the cylinder is transmitted to the electronic controller (16), the electronic controller (16) preventing the piston displacement as far as the stroke end.

12. A fluid pump (10) controlling system, the fluid pump (10) comprising a piston displaceably positioned in a cylinder, the cylinder having a piston displacement stroke and the cylinder having a stroke end,

the fluid pump (10) being driven by an electric motor fed by electric power,

the system being characterized by comprising:

- a piston-position sensing assembly (11), and
- an electronic controller (16) associated to the sensing assembly (11), monitoring the piston displacement within the cylinder by detecting an impact signal, the impact signal being transmitted by the sensing assembly (11) upon occurrence of a impact of the piston with the stroke end, the impact

signal being transmitted by the sensing assembly (11) to the electronic controller (16);

the electronic controller (16) successively incrementing the piston displacement stroke from a trigger signal until the occurrence of impact to store a maximum value of piston displacement, and monitoring the piston displacement within the cylinder and preventing displacement as far as the maximum value of piston displacement.

13. A system according to claim 12, characterized in that the electronic controller (16) prevents piston displacement as far as the stroke end by decrementing the level of voltage applied to the motor.

14. A system according to claim 13, characterized by comprising a first filtering circuit (4) associated to the electronic controller (16), the first filtering circuit (40) being of the high-pass type, the impact signal read by the sensing assembly (11) being filtered by the first filtering circuit (40) and being fed to the electronic controller (16).

15. A system according to claim 14, characterized in that the sensing assembly (11) comprises an accelerometer fixed close to the cylinder of the pump fluid (10), the impact signal being generated by the accelerometer.

16. A system according to claim 13, characterized in that the sensing assembly (11) comprises a position sensor (36) to sense the piston displacement, the position sensor being associated to the electronic controller (16).

17. A system according to claim 13, characterized in that the sensing assembly (11) comprises a second filtering circuit (42), associated to the electronic controller (16), the second filtering circuit (42) being of the low-pass type, the signal read by the sensing assembly (11) being filtered by the second filtering circuit (42) and being fed to the electronic controller (16), the signal read being filtered by the second filtering circuit (42) and corresponding to a signal of piston displacement within the cylinder.

18. A fluid pump controlling method, the fluid pump (10) comprising a piston displaceablly positioned in a cylinder,

- the cylinder having a piston displacement stroke, and
- the cylinder having a stroke end,

the method being characterized by comprising the steps of:

(a) monitoring the piston stroke in the cylinder to detect an impact thereof with the stroke end,

(b) monitoring the piston stroke for a stabilization time, and

(I) incrementing the piston stroke if no impact occurs during the stabilization time and repeating the step (b), or

(II) decrementing the piston stroke if an impact occurs during the stabilization time.

19. A method according to claim 18, characterized in that, prior to the step (a), a step of incrementing the piston stroke is foreseen.

20. A method according to claim 19, characterized in that, prior to the step of incrementing the piston stroke, the fluid pump (10) is started with a minimum piston displacement stroke.

21. A method according to claim 20, characterized in that the step of starting the fluid pump (10) with a minimum piston displacement stroke is carried out upon initiating the functioning of the fluid pump (10).

22. A method according to claim 21, characterized in that the step of starting the fluid pump (10) is carried out periodically.

23. A method according to claim 22, characterized in that the step of starting the fluid pump (10) is carried out upon occurrence of a failure.

24. A method according to any of claims 18 to 23, characterized in that, after the step (ii), the piston stroke is operated in a constant way.

25. A method according to claim 24, characterized in that, after the step of operating the stroke in a constant way, the storage of the value of the maximum piston displacement at the electronic controller (16) is foreseen.

26. A method according to claim 24, characterized in that, after the step of operating the stroke in a constant way, the piston stroke is monitored.

27. A fluid pump controlling method, the fluid pump (10) comprising a piston displaceably positioned in a cylinder,

- the cylinder having a piston displacement stroke and
- the cylinder having a stroke end,
- the method being characterized by comprising the steps of:

(a) turning on the fluid pump (10), causing the piston to displace in the cylinder;

(b) successively increment the piston stroke as far as the occurrence of an impact thereof with the stroke end,

(c) monitoring the piston stroke for a stabilization time between the successive increments of the stroke, and

(d) decrementing the piston stroke if an impact occurs during the stabilization time.

28. A method according to claim 27, characterized in that, in the step (a), the piston stroke of the fluid pump (10) is initiated with a minimum displacement stroke.

29. A method according to claim 28, characterized in that, after the step (d), the monitoring of the piston displacement is foreseen.

30. A linear compressor comprising a piston displaceably positioned in a cylinder, the cylinder having a piston displacement stroke and the cylinder having a stroke end,

the system being characterized by comprising:

- a piston-position sensing assembly (11), and
- an electronic controller (16) associated to the sensing assembly (11), the electronic controller (16) monitoring the piston displacement within the cylinder by detecting an impact signal, the impact signal being transmitted by the sensing assembly (11) upon occurrence of a impact of the piston with the stroke end, the impact signal being transmitted by the sensing assembly (11) to the electronic controller (16),

the electronic controller (16) successively incrementing the piston displacement stroke as far as the occurrence of the impact to store a maximum value of piston displacement.

31. An environment cooler, characterized by comprising a control system as defined in claims 1 to 11.